Public Low-Cost Housing Design: The Residents' Perception

Sunusi Bashari, Ahmad Hariza Hashim, Asnarulkhadi Abu Samah, Nobaya Ahmad

Abstract: : The purpose of this paper is to explore the design of public low-cost housing in Jigawa State, Nigeria and assess how residents perceived the housing units in relation to their culture and impact on their well-being. The housing units were constructed as an intervention by the government for low-income earners. This research was conducted through both qualitative and quantitative approaches. In qualitative aspect, three respondents were interviewed to express their perception on the public low-cost housing design, while quantitative aspect assessed the residential housing attributes of low-cost housing estates with view to identify the important housing attributes considered by the residents for their well-being and was used to support the qualitative aspect. This was achieved through descriptive statistics using Relative Importance Index (RII). A well-structured questionnaire was administered to the residents of public low-cost housing of Jigawa state, Nigeria. The results indicated that, the design of public low-cost housing in Jigawa State, Nigeria does not reflect the culture of the residents, most of the residents were not satisfied with it. In addition, out of fifty five (55) constructs from five (5) housing-related dimensions, the result identified thirty two (32) important attributes out of these, the residents considered twelve (12) to be the most important attributes affecting their well-being. Thus, the paper would serve as a blueprinted government, housing policy makers and housing developers to understand that, the housing constructions and infrastructural elements should reflect the cultural background of the beneficiaries. Views of beneficiaries before and after construction of public low-cost housing are of great importance. The findings of this paper were based on reviewed of earlier studies on residential-housing units, field work and research conducted on particularly the public low-cost housing in Jigawa State, Nigeria

Keywords: Culture, Low-cost housing, Residents' perception, Well-being

I. INTRODUCTION

Housing is regarded as one of the basic needs of mankind providing not only shelter but also private and dynamic setting for social activities and interactions [9]. Alaghbari, Salim, Dola, and Abdullah Abang Ali [3] viewed housing as a factor which is well known to be very important in human life and plays role in both social and economic aspects on the total living environment of the world. Alaghbari et al. [3] viewed housing as a factor which is well known to be very important in human life and plays role in both social and economic aspects on the total living environment of the world. Majority of low-income earners in Nigeria live in poor quality and substandard housing because access to quality housing is far beyond the economic reach of the most of the citizen [23].

In Nigeria, statistics has shown that over 7 out of every 10 people live below the minimum poverty level and 9 of every 10 are in the low-income group [11]. This indicates that, these people cannot provide housing for themselves, they need intervention from government through public low-cost housing. Public Low-cost housing has been defined as constructed public residential houses funded by the government or in partnership with the government under the public-private partnership (PPP) scheme, to provide affordable housing for low-income people [5], [23]. According to Olotuah [33] several interventions by government in Nigeria failed because, firstly the Government lack vital information on residents as such it has a wrong perception of the need of low-income earners which results in the provision of inadequate and wrong kinds of housing and aids for them, secondly there has been improper planning and poor execution of housing policies and programs. These programs, aside from direct house construction of low-cost houses by the Federal Government, are not directed at low-income earners and lastly, Government has always provided very few number of houses which are nonetheless too expensive for low income earners, most of the residents dissatisfied with the design and are taken over by the affluent in the society.

II. LITERATURE REVIEW

There are important information that need to be gathered on socio-cultural aspects of the beneficiaries before construction of public housing schemes and after the construction certain information are also vital in giving supporting evidence which can be used to judge the performance of public housing schemes [15], [23]. Delgado & Troyer [10] observed that, in any housing projects apart from financial investment, users' need and preferences must be considered for a successful housing projects for low-income earners. Architects and planners in housing can only provide adequate housing if users' needs and preferences are well understood. Jansen [18] described residential preference as relative attractiveness to house by individual. This concept of

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preference became an important issue in housing studies because it gives clear image of households' priority for particular housing attributes. Thus, understanding the preference of housing will help in making housing policy and framework for future housing environment especially housing for the poor [19].

Turner [42] described the failure of housing programs in most of developing countries like Nigeria as a result of adopting and maintaining the minimum standard of housing introduced since 1915 from Western World and neglecting priority as well as needs of users in formulating housing programs. The minimum standard of housing outlined that; there should be a separate bedroom, an equipped bathroom and a kitchen should be separated from living area. In contrast, traditionally, in Nigerian culture, the household slept according to age and sex. When the children were young, they slept in the same enclosure as their parents. As they reached puberty, the parents built special enclosures with the men often having their own individual space and the women staying together. These units were separated and in different parts of the yard, given each a great sense of privacy [24]. In addition, the typical 'modern' three-bedroomed house all the bedrooms are located together. The negative comments in these homes often focused on the bedrooms and their proximity (resulting lack of privacy) or that the master bedroom was not large enough to allow smaller children to sleep there as well [41]. This design is against the culture and traditions of Nigerians, because there is a strong relationship between culture and environmental design as such cultural differences must be considered in design procedure and identification of environmental effects on people living in a particular environment [37].

Linton [21] defined Culture as a complete way of life of any society. Generally, Muslims living in different countries are influenced by cultural factors that function in their respective country of residence. Cultural factors assist in shaping the architectural use of space and styles within Muslims houses in several ways [34]. Rapoport [36] viewed components of culture should comprises of worldviews (expectations, standards, values, norms, rules and meanings), social network, kinship and kinship relations, and family structure. Rapoport [36] confirmed that these components have influence in shaping or forming the built environment. Design of the built environment is the association of four things: communication, space, meaning and time. Then, it becomes necessary to consider, investigate and discuss the implication of each for a given culture. One may find space organization (and form) is more important, while other may take shape is more important as in the case of identity, religion etc. as such to be specific become necessary whether about culture or the environment.

However, few studies focused on the role of natural environment in people's self-assessments of life satisfaction. Jabareen [17] findings in the study of culture and housing preferences in developing city revealed housing preferences in Gaza are determined by components of culture such as social relations, religions, kinship, gender and politics. The conclusions was that among the cultural components, attitudes and kinship relations toward women are possibly to be the most important for individual Palestinians seeking new housing. Houses reflect culture, whether through everyday uses or purposeful design. House forms, such as their interior layouts, and the dwellings layout in a neighborhood can be supportive or disrupting of the culture of their inhabitants [17].

Most of low-cost housing estates are usually of low standard and in most cases the housing design does not addresses the socio-cultural lifestyle of the low income groups in Abuja, Nigeria [29]. Olayiwola, Adeleye & Jiboye [32] in their research the effect of socio-cultural variables on housing quality in Oshogbo, Nigeria, they found out that, the level of quality building and elements such as design, building space, drainage system are below the desired and expected standard in the study area. This may be attributed due to negligence of some aspect of culture in the housing design. Understanding of the multi factorial nature of the influences on the Muslim perception on the housing unit and the use of space is very important for building designers, architects, engineers and builders to be effectively equipped to meet the needs and aspirations of the beneficiaries [34]. In this regard, majority of people in Jigawa state are Muslims, they value privacy in their housing setting especially when one refer back to their traditional housing.

Fadairo & Olotuah [11] studied public low-cost housing for urban poor focusing on materials and techniques of construction in Lagos State, Nigeria and their findings showed that, the low-income earners can solved the problem of high cost of building materials encountered by adapting the use of locally available materials and building construction techniques. Eziyi Offia Ibem, Aduwo, and Uwakonye [14] concentrated their research on adequacy of incremental construction for housing low-income urban residents in Ogun State, Nigeria, their findings showed that housing environment in the housing estate met the needs of the respondents in terms of provision of adequate housing unit characteristics much higher than social infrastructure, housing services and management of the housing estate. This means that, the residents need much on social infrastructure, housing services and improvement in estate management.

In their research, Mohit and Iyanda [27] revealed that residents of public low-cost housing in Niger State, Nigeria, indicated low satisfaction with safety situation, neighborhood facilities and social interaction among the residents, more especially security challenges at night as well as inadequate schools and hospitals around the housing estates. Assessment of the quality of life of Benin City, Nigeria conducted by Olajuyigbe, Osakpolor, and Adegboyega [31] revealed that, there is need to improve social, physical and economical aspects of life of the inhabitants through provision of basic amenities. Asiyanbola, Raji, and Shaibu [4] stated that most of public essential facilities and social amenities were not in good conditions to support human well-being at Ago-Iwoye and Ijebu-Igbo housing estates, both located in Ogun State, Nigeria.

Therefore, based on literature review, The expectation of people on residential housing attributes varies with socio-demographic parameters which affect the ways through which neighbors interact with others and determine how they use shared outdoor spaces [20], [35]. This means apart from socio-demographic factors, cultural factors also influences people expectations,

preferences, and aspirations regarding residential livability. This is confirmed by Rapoport [37] who listed five factors that have strong influence on the built form; these are social interaction, family, basic needs, privacy and position of women. In addition, Rapoport [37] stressed that these factors could be used as a tool to design the organization of a house or a whole neighborhood that comprises the interaction between the dwelling and public spaces. However, none of these studies focuses on public low-cost housing design in relation to the perception of residents in Jigawa State, what housing attributes do residents considered most important based on their culture. This research tends to bridge the gap in literature by exploring public low-cost housing design: residents' perception and determine the most important attributes considered by the residents.

III. METHODOLOGY AND MATERIALS

This research employed both qualitative and quantitative methods. First, the research focuses on the qualitative dominant approach to confirm qualitative research results through quantitative method. In the literature review, residents of public low-cost housing estates in Jigawa State do faced with a lot of problems and the housing scheme provided has unanticipated effects on the residents' well-being. Therefore, there is need to identify how residents perceived residential public low-cost housing attributes, which only qualitative aspect of the research can give the details. In this research phase, qualitative design was preferred through case study method. The choice of qualitative method was as a result of the issue at stake is perception on certain elements of housing which is more of interactive process, understanding it, require suitable qualitative rather than quantitative method [16]. Questions such as "why" and "how" were asked so as to tap information on the issue under investigation.

Ritchie and Lewis [38] stated, purposive sampling is often used for selecting a sample in most of qualitative research. Here, the respondents were purposely selected to represent the particular features of a group within the sampled population, among the features were; they are adult, head of the family, civil servant which make them appropriate for small scale, but better understanding and in-depth exploration of the phenomenon that the researcher intended to study [38]. Thus, in this study, three respondents were purposely selected through snow-balling and were all residents of public low-cost estates in Jigawa state, Nigeria. Moreover, quantitative research aspect was employed to identify the most important residential housing attributes considered by the residents of public low-cost housing in Jigawa State. The researcher chose to use survey research design by using questionnaire for the data collection, whereby a sample of population was obtained through multi-stage cluster sampling, such as simple random sampling, proportionate random sampling and systematic sampling. One hundred (100) housing units were randomly selected across the three sample public low-cost housing estates in the study area and administered 100 questionnaire of which 92 were returned which marked the 92%. The respondents were asked to assess the fifty five (55) constructs of the five (5) residential housing-related attributes for perception of public low-cost housing through 7-point Likert scale (of 1=not important; 2=low importance; 3=slightly important; 4=neutral; 5=important; 6=very important; 7=most important). Then

thereafter, data analysis with descriptive and inferential statistics particularly Relative Importance Index (RII) was used to identify what residents of public low-cost housing considered the most important among the residential housing-related attributes.

IV. RESULTS, FINDINGS AND DISCUSSIONS

A. Qualitative Aspect
Public Low-Cost Housing Design

Generally, there are two types of public low-cost housing estates in Jigawa State, one bed-room and two bed-room, their designs differed. For instance, one bed-room housing estate include 744 housing estate and some housing units at Fatara housing estates. While two bed-room housing estates are; Yadi and Red-Bricks housing estates. The researcher conducted an interview with respondents as follows;
Informant 1, described the housing design of 744 housing estate as just a one bed-room and a parlor, toilet and kitchen;
The design of 744 low-cost housing estate, is only one bedroom and a parlor, toilet and kitchen.
Informant 2, further explained other additional information on the housing design of 744 housing estate as follow;
The 744 housing estate do not have fence. Most of facilities provided are shared among all the houses. For example, toilet system (all houses are connected with single main pipe), common roofing ceiling and party wall.

In another perspective, the two bed-room housing design are almost similar in nature especially Takur and Yadi housing estates. Informant 3, has the following description of the two estates;
The design of Yadi housing estate is 10 housing units per 1 block, the houses are fenced. There is covered space which is used as main entrance/gate called "Zaure". There are two bedrooms, toilet, bathroom, and kitchen and court yard in each housing unit.

Research finding revealed the general housing design of all public low-cost housing estates in Jigawa State, have either one or two bed-room housing unit, toilet and sometimes bathroom separated from toilet, main door/entrance, windows, party wall (open spaces above ceiling level across all the housing units), close proximity of two bed-room's doors, verandah, open court yard and shared facilities like toilets system, ceiling roofing and wall boundary. This design is similar to what Noriza [30] described as standard design. According to her, this design of housing unit described mainly the interior aspects of the dwelling unit such as size of the house, size of the living area, location of other attributes like toilet and kitchen. Meanwhile, Mohit and Al-Khanbashi Raja [25] in their description of formal attributes of dwelling unit they pointed out the physical characteristics of housing unit as the size of the living area, washing area, laundry and kitchen space. Housing unit expected to consist certain attributes like number of bedrooms and bathrooms, level of sockets, aspects of housing such as housing quality, privacy, housing services provided by developers like ventilation of the house, brightness, garbage disposal and safety [40]. However, low-cost housing are said to be the housing unit that consist just the basic features as explained by some of the housing officials in Jigawa State. As stated

earlier, Jigawa State people are predominantly Muslims, the design of traditional Muslim house is based on certain guidelines from principles prescribed by Islamic Sharia obtained from the Quran (revelations of Allah to Prophet Muhammad) and Hadiths (utterances and actions of Prophet Muhammad) [34]. Residents explained their perception with regard to relationship between housing design and privacy.

Housing Design and Privacy

Residents were asked how they will relate the housing designs with their privacy in the respective housing estates, the researcher wanted to know whether the housing design ensure privacy based on their understanding with the term "privacy". Informant 1, the resident of 744 housing estate explained the design of the housing unit in relation to his privacy in the house;

The design of this low-cost housing estate, there is nothing like privacy, because, the design of this housing unit is only one bedroom and a parlor, which to me the design is for only for one person for life, if I can relate the housing unit to my culture. In Nigerian culture, where ever you are working, you tend to go with your family (wife/husband), as the time goes on, the family will increase in number (having children), so as Muslims, we need privacy and my culture require separation of children based on sex and age. You see, this housing unit is only one bedroom and a parlor, as such the design does not guarantee privacy especially for a family man having wife and children.

Informant 2, added his experience as a resident for over 15 years in 744 housing estate;

Actually the design of this housing estate do not ensure privacy, because there is no fence. If you are living in a housing unit at times like you are living at outside room, because people from outside can see you. Most of facilities provided are shared among all the houses. For example, toilet system (all houses are connected with single main pipe) and common roofing ceiling, so whatever happen to your neighbor may affect you as well. No privacy at all.

Contrary, to the views of informants 1 and 2, according to the informant 3, the housing design of Yadi housing estate, addresses the culture and privacy of Hausa ethnic group especially in the structure like fencing and "Zaure" (roofed entrance). To him, apart from sharing of common facilities and proximity of the doors of the two rooms, the housing design ensure privacy;

In this housing unit, the housing design include, Main entrance, two bedrooms, toilet, bathroom and kitchen. The design does not allow direct view from outside the house to the interior except through main entrance if opened, few spaces can be viewed like courtyard, but there is wall fencing, this main entrance is roofed and used to receive strangers. Apart from this, other places like kitchen, toilet, bath room, bedrooms etc. cannot be viewed even if main entrance is opened. These are some of the design attributes that address privacy in Hausa Culture.

Residents were asked whether the housing design of their respective housing estates ensure privacy or there were need to improve the design. The result of this aspect indicated that, generally, the housing design of all public low-cost housing estates in Jigawa State does not ensure privacy to the residents of the estates. Considering the design of the housing unit in relation to the culture of Jigawa State people where they value privacy as the most important aspect in their life style. For instance, apart from Takur and Yadi housing estates, all housing units within all public low-cost housing estates have no fence or wall demarcation. This fence or wall demarcation provide maximum privacy as encouraged by Hausa/Muslims' culture. Larger family is part of the culture of the Jigawa State people, present one or two bed-room housing unit is not what residents wants and is not recommended for the larger family. Also, there were limited number of toilets and bathrooms which in most of the houses the toilet system are shared among the neighbors. Noriza [30] marked these features such as number of bed-rooms, size, and location of kitchen as relevant to resident's well-being. Little or absent of theses affects general well-being of the residents. Li, Sun & Jones [20] in their study, found out that, some residents preferred to live in three-bedroom dwelling units not one or two bedroom design. Similarly, in their findings, the study of Mohit and Iyanda [26] in Nigeria, indicated that, although the respondents are living in two and three bedrooms, but they preferred four bedroom. In addition, the size of windows at Takur, Yadi and 744 housing estates were either very small, limited in number, no cross ventilation or positioned at very low level to the ground which allowed children view from outside.

Housing Design Attributes and Privacy

Residents of these low-cost housing estates in Jigawa State, complained about certain housing design attributes which directly affect the privacy of their families. They mentioned position of the toilet, shared facilities and limited number of bed-rooms and windows to mention just a few were among the housing designs attributes that affect the privacy of their families. Informant 1, had this to say;

Actually, the design of the toilet is not well designed, if a visitor or a stranger come to your house, he/she can easily sighted you while you are entering into the toilet, because, toilet is directly facing people who are sitting in the parlor. How long you stayed in the toilet can easily be estimated, which to me is not in line with our privacy and culture in general.

Informant 2, added comments on how the housing design attributes affect his family's privacy as follows:

Of course, the design attributes that affect my family's privacy are shared facilities, for instance, from house number one, through ceiling some body can pass all the remaining three houses no partitioning between houses beyond ceiling (party wall). Although, I have already demarcated (blocked party wall spaces) between my housing unit and my neighboring housing units. If not demarcated, whoever talk in his or her room, his or her neighbor will hear the voice from his or her own room, as such no privacy. But as long as you separated your housing unit by constructing wall to block the spaces between neighbors there will be no sound of discussions.

As usual, residents of Yadi housing estate, have different views with regards to housing design attributes in relation to

privacy of the families. Informant 3, emphasized that, his family were well protected none of the housing design attributes have negative impact on them, he explained;

Generally, if you consider the design of this housing unit, the design attribute does not affect my family's privacy as I have explained earlier. For example, the housing unit is fenced, if the main entrance is facing west direction, the two rooms are facing east direction, this means, even if the main entrance is open, those outside will not have direct view to the rooms, toilets and kitchen. The toilet/bathroom are facing towards south direction while the kitchen is facing towards north direction. In short, the design attributes has no any effect on my family's privacy at all.

Spatial and architectural elements such as bedrooms, doors and windows are not only functional features but also they employ substantial role on human domestic interactions and behavior within home environment [13]. This study revealed that, some of the housing designs attributes affect the family's visual privacy as explained by the residents during individual interview. Some of the respondents pointed out that, the designs of position and location of some attributes such as toilet, doors, windows were positioned and located in such as a way that family inside the house are exposed to the visitors, strangers and passerby. Visual privacy is the most important aspect of privacy which serve as the predominant design objective to ensure the safety and privacy of female members within Muslim houses [2]. This type of privacy can be achieved through several external designs interventions, such as the design and location of entrance doors, the sizes and placement of windows and openings, the control of building balconies and heights, and the including of internal court yard and gendered spaces [6], [12] and [28]. Although, there were need for more bedrooms because of the limited number of bed-rooms across all public low-cost housing in the state, but respondents have the opinion that, provision of more bed-rooms in the housing unit is not sufficient to provide privacy for the family in almost all the housing estates.

To ensure sufficient privacy, residents wanted the location and positioned of the main entrance/proximity of doors in two bed-rooms housing estates and windows to be adjusted to their culture. In addition, there should be fencing of the housing unit, provision of more toilets and bathrooms. This residents' perceptions is similar to the suggestions given by Bahammam [6], Bekleyen and Dalkiliç [8] and Mortada [28] that, the front of main entrance door is the most recognized demarcation between private and public realms. Main entrance doors in traditional Muslim houses are placed away from the main road/street and not directly facing the opposite neighbors.

B. Quantitative Aspect

In quantitative aspect, Relative Importance Index (RII) was used to determine most important public low-cost housing-related attributes for low-income people in jigawa State. Basiru, Yacob, Radam, and AbdManaf [7] described the use of Relative Importance Index in analysis as one of the best method using a ranking of multivariate correlation coefficient from high to low as the most helpful approach for ranking the relative importance attributes. Previous studies such as Lukuman, Sipan, Raji, and Aderemi [22], Tanko, Abdullah, and Ramly [39] and Adegoke [1] used RII on various studies.

Respondents (residents of public low-cost housing) were explored with 7 Likert scale so as to determine the relative importance index (RII) of the fifty five (55) constructs of the five (5) public low-cost housing dimensions for the assessment of the perception of the residents. The RII was explored using:

RII= $(\sum W)/(A \times N)$

Whereas:

W- Represents weight given to each factor by the residents (1=not important to 7=most important).

A- Represents highest weight

N- Represents total number of residents responded.

A decision rule was adopted in determining the ranges for most important (MI) to not important (NI) using:

RII Decision Rule= (Max RII-Min RII)/A

The magnitude is weighted by the maximum value (A) of the response category which depends on the rating scale adopted. Therefore, the rating index is expected to range between 0 and 1 irrespective of the scale. The interpretation is, the closer an attribute's score approaches 1, the higher is its perceived importance about others and vice-visa.

Table 1 indicated the residents' ranking of public low-cost housing attributes within and among the groups. The 1st most important attribute is neighbors' friendliness (RII=0.859), availability of Masjid (Mosque) attribute ranked 2nd the most important with RII (0.852) and 3rd most important attribute is accessibility to electricity/power supply (RII=0.849). The 4th most important attribute is trust to neighbors (RII=0.837), 5th most important attribute is number of toilets in the housing unit (RII=0.821). Meanwhile, both safety from crime and access to water supply ranked 6th the most important attributes each with (RII=0.82 each). (See table 1).

The findings of this study confirmed that each of the dimension selected were found to be the most important dimension in relation to public low-cost housing in Jigawa State. These include: social environment-related; physical environment-related; functional environment-related; dwelling unit features-related and safety and crime-related. This is because the top ten (10) most important public low-cost housing attributes distributed across these 5 dimensions. However, there were public low-cost housing attributes that residents ranked as very important to them, these include; size of the housing unit, number of bathroom, police protection, and distances to place of work, school and hospital. Furthermore, ventilations spaces, cleanliness of the drainage, noise level, community associations, distance to market, etc. have been ranked as important attributes by the residents (See table 2).

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Table 1: RII and ranking of public low-cost housing attributes

Attribute	Code	NI (1)	LI (2)	SI (3)	N (4)	I (5)	VI (6)	MI (7)	SUM	RII	RANK WITHIN	RANK	RANKING
Dwelling unit													
The size of Housing unit	DUF1	1	6	9	56	90	168	175	505	0.784	3rd	13th	VI
The size of Living area	DUF2	1	12	51	64	90	114	105	437	0.679	7th	31st	I
The number of Bedroom	DUF3	0	2	9	48	90	174	203	526	0.817	2nd	8th	MI
The size of Dinning area	DUF4	17	14	33	92	90	36	70	352	0.547	10th	49th	SI
The Ventilation spaces	DUF5	2	8	27	76	95	96	161	465	0.722	5th	24th	I
The number of Toilet	DUF6	0	2	3	28	145	162	189	529	0.821	1st	5th	MI
The number of Bathroom	DUF7	3	10	9	64	115	108	168	477	0.741	4th	20th	VI
The size of Kitchen	DUF8	10	12	36	80	85	96	77	396	0.615	9th	43rd	N
The size of Drying area	DUF9	7	6	48	76	95	96	84	412	0.639	8th	38th	N
The Cleanliness of the drainage	DUF10	8	8	36	64	70	72	182	440	0.683	6th	29th	I
Social Environment													
Noise level	SE1	8	20	9	36	105	132	133	443	0.688	5th	28th	I
Guard keeping you at night	SE2	6	14	21	44	105	114	147	451	0.7	4th	27th	I
Neighbors' friendliness?	SE3	0	0	0	44	90	132	287	553	0.859	1st	1st	MI
Neighborhood helpful?	SE4	2	4	15	32	75	144	252	524	0.814	3rd	9th	IM
Trust your neighbors?	SE5	0	2	12	40	75	144	266	539	0.837	2nd	4th	MI
Community Association?	SE6	5	14	39	64	70	78	168	438	0.68	6th	30th	I
Being a member of any association?	SE7	14	22	51	64	50	48	112	361	0.561	7th	47th	SI
Physical Environment													
Play area	PE1	16	18	27	56	100	84	70	371	0.576	10th	46th	SI
Parking area	PE2	6	20	33	64	90	96	105	414	0.643	6th	35th	N
Masjid (Mosque)/ Church	PE3	0	8	0	28	85	120	308	549	0.852	1st	2nd	MI
Perimeter road	PE4	7	30	54	40	95	66	84	376	0.584	8th	44th	SI
Pedestrian Walkways	PE5	7	28	45	96	85	36	63	360	0.559	11th	48th	SI
Work place	PE6	0	4	12	64	175	114	112	481	0.747	4th	19th	VI
Police Station	PE7	5	6	9	100	85	150	98	453	0.703	5th	26th	I
Multipurpose hall	PE8	17	30	75	76	50	18	21	287	0.446	13th	54th	NI
Local shops	PE9	2	14	57	88	105	78	56	400	0.621	7th	42nd	N
Food Stalls	PE10	7	16	60	64	115	72	42	376	0.584	8th	44th	SI
Motor park/bus stop	PE11	1	6	12	60	125	150	133	487	0.756	3rd	17th	VI
Library	PE12	30	30	57	32	65	12	35	261	0.405	14th	55th	NI
Green Space	PE13	20	30	42	36	95	42	56	321	0.498	12th	52nd	LI
Market	PE14	3	0	3	44	160	126	168	504	0.783	2nd	14th	VI
Safety and Crime													
Police protection	SC1	6	10	9	32	60	192	182	491	0.762	4th	15th	VI
Vigilante protection at night	SC2	4	14	24	32	80	144	175	473	0.734	5th	21st	VI
Safety from crime	SC3	2	4	12	36	100	150	210	514	0.798	3rd	12th	MI
Safety from accident	SC4	0	2	9	40	125	114	238	528	0.82	1st	6th	MI
Property safety	SC5	1	2	15	52	80	150	217	517	0.803	2nd	10th	MI
Fire brigade service available	SC6	8	12	39	80	45	114	119	417	0.648	6th	34th	N
Street light	SC7	15	18	39	48	40	24	217	401	0.623	7th	41st	N
Functional Environment													
Distance to town center	FE1	1	6	12	80	170	96	98	463	0.719	8th	25th	I
Distance to work place	FE2	2	6	15	60	150	132	105	470	0.73	6th	22nd	VI
Distance to School	FE3	0	6	15	52	145	156	112	486	0.755	5th	18th	VI
Distance to Hospital	FE4	2	8	15	44	105	168	147	489	0.759	4th	16th	VI
Distance to shopping center	FE5	4	18	33	104	95	72	77	403	0.626	14th	40th	N
Distance to Market	FE6	1	4	51	80	120	102	77	435	0.675	9th	32nd	I
Distance to Bus Station/ Motor park	FE7	4	24	57	20	105	132	63	405	0.629	13th	39th	N
Distance to public Library	FE8	19	18	75	56	40	72	35	315	0.489	17th	53rd	LI
Distance to Mosque / Church	FE9	0	2	24	32	90	180	189	517	0.803	3rd	10th	MI
Distance to play area	FE10	12	18	51	108	90	12	49	340	0.528	15th	50th	LI
Nearness to green space	FE11	9	32	60	60	110	30	35	336	0.522	16th	51st	LI
Availability of Public transport	FE12	3	2	24	56	145	132	105	467	0.725	7th	23rd	I
Distance to Police station	FE13	6	6	30	64	150	114	56	426	0.661	10th	33rd	N
Distance to Fire station	FE14	5	14	54	56	80	114	91	414	0.643	11th	35th	N
Access to Water supply	FE15	3	10	6	24	50	162	273	528	0.82	2nd	6th	MI
Access to Electricity/Power supply	FE16	1	0	6	40	70	150	280	547	0.849	1st	3rd	MI
Nearness to food court	FE17	5	8	39	88	125	72	77	414	0.643	11th	35th	N

NOTE: NI=Not important, LI=Less Importance, SI=Slightly Importance, N=Neutral, I=Important, VI=Very Important, MI=Most Important and RII=Relative Important Index

Table 2: Top ten (10) most important public low-cost housing attributes considered by the Jigawa State low-cost housing residents

Attributes	Code	Attribute	RII	Rank
Neighbors' friendliness	SE3	Social Environment-related	0.859	1st
Masjid (Mosque)/ Church	PE3	Physical Environment-related	0.852	2nd
Access to Electricity/ Power supply	FE16	Functional Environment-related	0.849	3rd
Trust your neighbors?	SE5	Social Environment-related	0.837	4th
The number of Toilet	DUF6	Dwelling features unit-related	0.821	5th
Safety from accident	SC4	Safety and Crime-related	0.819	6th
Access to Water supply	FE15	Functional Environment-related	0.82	6th
The number of Bedroom	DUF3	Dwelling features unit-related	0.817	8th
Neighborhood helpful?	SE4	Social Environment-related	0.814	9th
Property safety	SC5	Safety and Crime-related	0.803	10th
Distance to Mosque / Church	FE9	Functional Environment-related	0.803	10th

V. CONCLUSION

A The study revealed the general housing design of all public low-cost housing estates in Jigawa State, as either one or two bed-room housing unit, toilet/ (sometimes separated from bathroom), main door/entrance, windows, party wall (open spaces above ceiling level across all the housing units), close proximity of two bed-room's doors, verandah, open court yard and shared facilities like toilets system, ceiling roofing and wall boundary. Residents emphasized that, the housing design does not ensure privacy of the residents if compared to culture of Jigawa State people where they value privacy as the most important aspect in their life style. This is because most of the housing units lack fence or wall demarcation which they provide maximum privacy as encouraged by Hausa/Muslims' culture. The qualitative aspect results identified some of the housing designs attributes that affected the family's visual privacy as explained by the residents during individual interview. Some of these were the designs of position and location of some attributes such as toilet, doors, windows etc. which were positioned and located in such as a way that family inside the house are exposed to the visitors, strangers and passerby. This conditions have negative impact on the residents' subjective well-being.

In addition, the quantitative result assessed fifty five (55) public low-cost housing attributes distributed across five (5) main residential dimensions. These dimensions (dwelling unit features, social environment factors, physical environment factors, functional environment factors and safety and crime indicators) were found to be relevant to this study as they contained some attributes that were ranked as the most important to the residents. Apart from 12 most important attributes, 10 very important attributes and 10 important attributes as discussed earlier, the study also revealed 10 neutral attributes as ranked by the residents, among them are; size of the kitchen, parking area, size of drying area, street light, distances to shopping center, motor park, fire station etc.

Moreover, the residents of public low-cost housing preferred the housing design that will ensure privacy of their family in term of; provision of wall demarcation; more number of bedrooms, toilets and the position of main entrance should not face directly to the main street/road. The residents also, found sharing of toilets system and common roofing as part of housing design that affect the well-being. Other public low-cost housing attributes that perceived and ranked as the most important to them are; Masjid, social interaction, neighbors' friendliness and helpful. Therefore, future construction of public low-cost housing in Jigawa State should incorporate these attributes/items in order to improve the well-being of the residents.

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